

MODEL 50 CRYSTAL FILTER KIT
Part No. 150-200

General

The crystal filter for the Executive Model 50 transceiver is designed primarily to reduce adjacent channel interference. It consists basically of a transistor Hi IF amplifier. The filtering action takes place in a specially designed crystal filter operating between the transistor Hi IF amplifier and the second converter input.

Inspection

Your crystal filter should be unpacked and all parts inspected and checked against the parts list as soon as it is received. Any shortage should be reported immediately. In cases of damaged equipment, a full report should be forwarded to the factory. You will then be advised as to the disposition to be made of the kit.

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The first thing I noticed when I stepped out of the car was a sharp, cold breeze. It felt like a giant hand reaching out to shake me. I shivered, my teeth chattering. The sun was high in the sky, but it felt like it was miles away. The ground beneath my feet was uneven, covered in dry leaves and twigs. I took a few steps, feeling the rough texture of the earth. The air smelled strange, like a mix of old wood and something I couldn't quite identify. I looked around, trying to make sense of the scene. The trees were tall and thin, their branches reaching up towards the sky. The leaves were a mix of green and yellow, some still clinging to the branches, others having fallen to the ground. The ground was a mix of dirt and small stones, some of which I could see clearly as I walked. The sky was a pale blue, with a few wispy clouds scattered across it. The overall feeling was one of isolation and mystery. I had no idea where I was, and I had no idea what was going on. The only thing I knew for sure was that I was alone.

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PARTS LIST

DESCRIPTION	PART NO.	QTY.
Filter board	150-175	1
Filter socket	186-100	1
Filter shield	152-112	1
Converter shield	152-111	1
3/8" spacer	247-101	2
7/8" 4-40 machine screws	241-414	2
4-40 nuts	243-103	3
#4 lock washers	244-202	5
#4 flat washers	244-102	5
Ground lug	221-401	1
1/4" spacer	247-109	1
6 1/2" white wire, staked on one end	881-529	1
6 1/2" blue wire stripped at both ends	881-526	1
2" piece buss wire	881-500	1
5/8" 4-40 machine screw	241-409	1



MARK LIST

QTY	UNIT NO.	DESCRIPTION
1	150-415	Filter panel
1	150-416	Filter panel
1	150-417	Filter panel
1	150-418	Filter panel
1	150-419	Filter panel
1	150-420	Filter panel
1	150-421	Filter panel
1	150-422	Filter panel
1	150-423	Filter panel
1	150-424	Filter panel
1	150-425	Filter panel
1	150-426	Filter panel
1	150-427	Filter panel
1	150-428	Filter panel
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1	150-492	Filter panel
1	150-493	Filter panel
1	150-494	Filter panel
1	150-495	Filter panel
1	150-496	Filter panel
1	150-497	Filter panel
1	150-498	Filter panel
1	150-499	Filter panel
1	150-500	Filter panel

INSTALLATION OF CRYSTAL FILTER AND ASSOCIATED SHIELDS

1. Turn your model 50 upside down with the front panel toward you. Remove the four rubber feet which hold the wrap around case. Remove the two sheet metal screws which hold the bottom cover in place. Place the rubber feet and sheet metal screws aside until reassembly.
2. Slide the bottom cover off the unit and set it aside. Turn the model 50 right side up; spring the wrap around cover out and lift it up and away from the unit. Set the cover aside.
3. To make installation of the crystal filter easier, turn the model 50 so the power transformer is next to the table and the bottom of the unit is facing you.
4. The crystal filter is to be mounted between the variable capacitor on the front panel and IF board which is the elongated printed circuit board directly in front of you, see fig. 5.
5. Fig. 8 is a detailed sketch of the crystal filter shield and mounting socket, and the proper order in which they should be installed.
6. To mount the crystal filter shield and socket it is necessary to drill two #33 holes in the metal chassis between the tuning capacitor and the IF board. The proper position of these two holes is very important and care should be taken when drilling them.
7. To avoid possible damage to the transmitter tubes it is advisable to remove them at this time. These two tubes are marked 6BH6 and 6CL8; they are located in the same compartment as the power transformer. Set these tubes aside.
8. To position the two holes for the crystal filter shield and socket; place the filter shield shown in fig. 8, vertically between the tuning capacitor and the IF board with the two mounting holes against the metal chassis.
9. Position the filter shield so its back side is parallel with the tuning capacitor shaft and centered with the shaft, see fig. 5.
10. Hold the shield in this position while you mark through its mounting holes with a pencil on the chassis.
11. Remove the filter shield and drill the two marked holes with a #33 bit. Be extremely careful when drilling these holes so the drill chuck does not damage the IF board or the tuning capacitor when the bit passes through the metal chassis. It is advisable to wrap several layers of electrical tape around the bit, about $\frac{1}{4}$ inch from the tip, to act as a stop and prevent the drill from damaging the IF board. Better control of the bit can be achieved if you will use a hand drill instead of an electric drill.

12. Now that you have the two mounting holes drilled you are ready to begin actual installation of the crystal filter kit.
13. Remove the wires from the converter board by pulling the connectors off the power pins with long nose pliers, see fig. 9. Do not lose the ferris iron sleeve on pin #3 of the converter board.
14. When the wires have been disconnected from the converter board, remove the 4-40 nuts and #4 flat washers from each corner of the converter board. Set these nuts and washers aside.
15. Lift the converter board from its mounting bolts and set it aside while you install the special shield between the converter and IF board. This shield is sketched in fig. 8, and its position is shown in fig. 5.
16. Remove the two #4 lockwashers and 3/8 inch spacers from the converter mounting bolts next to the IF board.
17. Place the converter shield over the two mounting bolts next to the IF board, see fig. 5.
18. Place two #4 flat washers supplied in the crystal filter kit over the mounting bolts. Replace the two 3/8 inch spacers and the #4 lockwashers. Fig. 2 is a sequence of how to replace mounting bolts and hardware.
19. Replace the converter board on its mounting bolts. Replace the #4 flat washers and 4-40 nuts at each corner of the converter. Tighten the 4-40 nuts until they are snug; do not over tighten these nuts due to the brittle characteristics of the phenolic board.
20. Be sure there are no wires caught under the mounting flange on the converter shield.
21. Replace the wires on the converter board in the following sequence (see fig. 9). Connect the pink wire from the receive selector switch (fig. 5) to pin #3; be sure to replace the ferris iron sleeve over this pink wire and slide it over the connector after the wire has been replaced.
22. You will notice that the white wire which connected to pin #1 on the converter board will no longer reach. This wire should be left loose for the time being, it will be connected later to the crystal filter.
23. Remove the 4-40 nut and #4 flat washer from the lower front corner of the IF board.
24. Place the ground lug over the IF board mounting bolt and replace the #4 flat washer and 4-40 nut.
25. Be sure to position ground lug so it can be reached easily.

26. Feed one end of the 3 inch piece of BUSS wire supplied in kit thru the holes in the end of pins A, B & C of crystal filter socket, leave one end long enough to reach from socket to ground lug under IF board. Solder wire at pins A, B & C.
27. Solder the WHITE wire supplied in kit to pin D of filter socket.
28. Solder the BLUE wire supplied in kit to pin F of filter socket.
29. For the proper mounting sequence of the crystal filter socket and shield, refer to fig. 8. This sketch shows the proper manner in which the mounting bolts, lock washers and bushings should be placed. When installing the crystal filter socket be sure to observe how the pins are lettered. Install the socket with pin A toward the back of the unit.

This completes the mechanical installation of the crystal filter.

30. Solder the free end of the buss wire connected to pins A, B & C of the filter socket to the ground lug you installed over the IF board.
31. Run the free end of the white wire connected to pin D of the filter socket through the cutout in the lower edge of the filter shield. Dress this white wire between the converter shield and the 6CL8A converter tube. Press the connector over pin #1 of the converter. Fig. 9.
32. Run the free end of the Blue wire connected to pin F of the filter socket under one edge of the IF board and solder it to the connector on pin #15 of the IF board. Fig. 1.
33. Install the crystal filter board in its socket.
34. Install the mounting bolt and spacer between the hole located at the top edge of the filter shield and filter board. See fig. 8 for detail of this mounting bolt and associated hardware.
35. Connect the white wire hanging loose from pin #25 of the IF board to the only power pin on the crystal filter board. This pin is located just below the filter board mounting bolt, fig. 4.
36. Install the 6BH6 tube in the 7 pin tube socket located in the power transformer compartment.
37. Install the 6CL6 tube in the 9 pin tube socket located in the power transformer compartment.
38. Check the installation of your crystal filter kit to be sure no mistakes have been made.
39. The following equipment will be required for the alignment of an executive transceiver with a crystal filter.

Signal Generator such as H. P. 606A, Clough-Brengle 550 or Equiv. It is important that the signal generator have a good attenuator and very little leakage signal. A generator such as the Heath LG-1 may be used providing an external pad of approximately 60 db is used and the generator operated on its high ranges.

Crystal Controlled Frequency Standard: International C12-B

Audio Output Meter such as H. P. -400D, Heath AV-3 or equivalent.

Vacuum Tube Voltmeter.

Battery or Battery Eliminator for operation of the unit on 12VDC

40. Make the equipment setup as shown in Fig. 3
41. Connect the signal generator through the PK box to the Executive Antenna terminal.
42. Connect the audio meter across the speaker terminals. Use the 3 volt range.
43. Install a Channel 9 receive crystal in position 2 of the Receive Selector Switch.
44. Turn the Executive unit on (use 115 VAC for these steps) and set the Receive Selector to crystal 9.
45. Turn the signal generator to Channel 9 as heard in the receiver. Use 30% modulation on the generator. Turn the C12-B RF Level Control full counter clockwise and selector switch to 9. Key the C12-B and zero beat the signal generator as heard in the Executive receiver.
46. Reduce the Signal Generator output to .3 microvolt and adjust the following coils for peak reading on the audio output meter.

T1	-----	top and bottom slugs
T2	-----	top and bottom slugs
L2	-----	RF Grid
L1	-----	Antenna
L4	-----	RF Plate
L7	-----	1st Mixer Plate
L8	-----	2nd Mixer Plate

47. Set the receiver to TUNE. Set the C12-B on Channel 8 and tune in the C12-B signal on the receiver. Measure the AVC voltage at terminal #23 on the IF board, fig. 1. Set the output RF LEVEL control on the C12-B for 5 volts AVC reading. Leave the RF LEVEL control at this point thru out the rest of the alignment.
48. Set the RECEIVE Selector on the Model 50 for crystal receive on Channel 9. Set the C12-B to channel 9 and carefully zero the signal generator. Apply .3 microvolt on channel 9 from the generator (about 1.5 volts AVC). Adjust the Channel 9 receiver crystal trimmer for maximum reading on the audio meter.
49. Set the C12-B to Channel 8.

50. Coils in the crystal filter (figure 4) are sealed with Dow Compound 881. This seal is rubbery and easily removed with a knife or solder aid point. Remove the seal from L15. Key the C12-B for Channel 8 signal and insert a tuning tool in the slug, turn clockwise (increase inductance) until the audio meter reading drops to a null. The sharpness of this drop in reading varies and depends somewhat on the input signal from the generator. Now turn the slug counter clockwise until the audio reading just reaches its peak from the sharp rise. Rock the slug back and forth to find the point at the top of the sharp increase. Leave the slug at this point.
51. Turn the set off and remove the 115 VAC cord.
52. Using a 12 inch piece of hookup wire and a .01 mfd ceramic capacitor make up a test jumper., fig. 6. Tack solder the .01 capacitor to lug #12 of the power plug on the bottom of the set. Remove the generator plug and insert the other end of the hook-up wire into the center post of the antenna socket, fig. 7.
53. Connect the 12 VDC power cord to the set and apply 12 VDC power. Turn the set on and volume full on. Adjust coil L8 for minimum reading on the audio meter. You will note an increase in the meter on either side of the correct setting. The minimum reading will be between 1.5 and 2.0 volts audio. (Note: this test applies noise pulses far in excess of those encountered in actual use.)
54. Reconnect the generator lead. Set Receive Selector for crystal receive on Channel 9. Set C12-B to 9 and zero signal generator. Apply 1 micro-volt on Channel 9 from generator (about 2.2 volts AVC). Reduce the volume control for a reading of 2.5 volts audio on the output meter.
55. While noting audio meter reading set C12-B on 8 and key; then to 10 and key. There should be no more than .5 volt drop in reading when C12-B is keyed (with volume set for 2.5 volts audio on Channel 9.) If the channel 9 signal is greatly reduced when 8 or 10 are applied from the C12-B, as previously set up, the filter has not been adjusted properly. A slight readjustment of L15 is required Coil L8 should then be rechecked as in step 10.
56. Replace the bottom cover and the wrap around case when the above alignment has been completed.
57. In actual operation you should notice considerable improvement of adjacent channel rejection if the crystal filter has been properly installed.

This completes the alignment of Model 50 adapted for use of a crystal filter.

PLACE
STAMP
HERE

International Crystal Mfg. Co., Inc.

18 NORTH LEE

OKLAHOMA CITY 2, OKLAHOMA

Warranty Registration

Model _____ Date Purchased _____ Kit ☐ Wired ☐

Owners Name _____

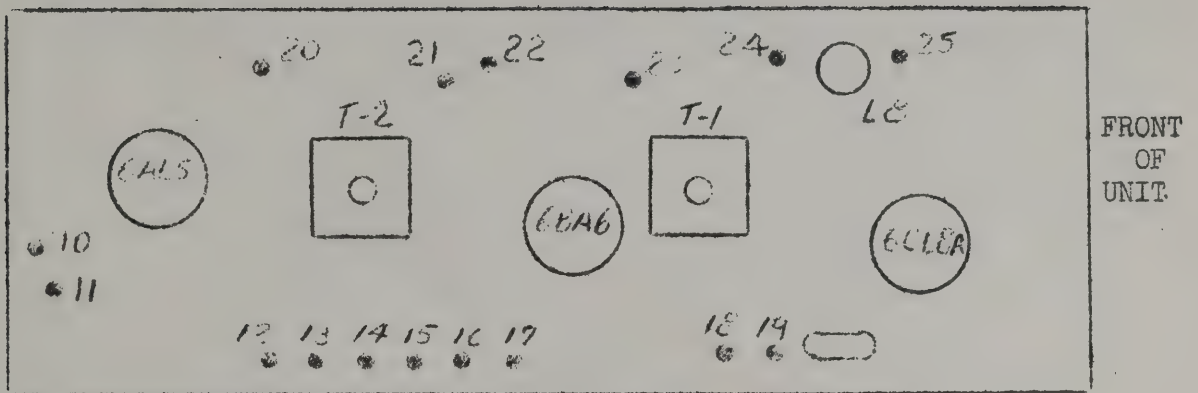
Address _____

City _____

State _____

Owner Call _____

Fig. 1



BOTTOM OF UNIT

MODEL 50		MODEL 100	
10. Shield	18. Not Used	10. Shield	19. White
11. White	20. Pink	11. White	20. Not Used
12. Green	21. Yellow	12. Green	21. Pink
13. Pink	22. Black	13. Pink	22. Yellow
14. Blue Jumper	23. Not Used	14. Yellow	23. Double Black
15. Double Blue	24. White	15. Double Blue	24. Not Used
16. Red		16. Double Blue	25. White
		17. Red	
		18. Double Pink	

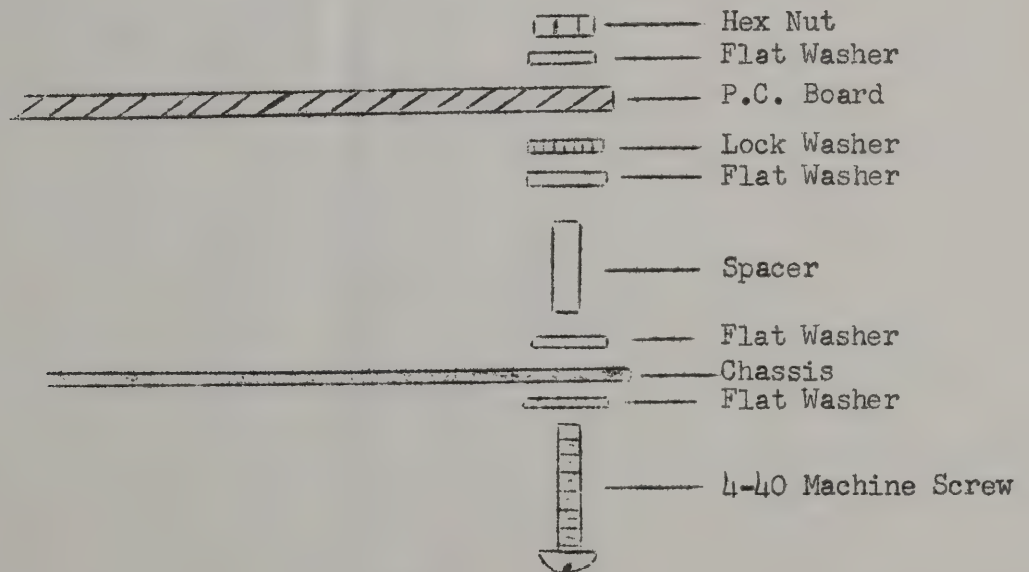


Fig. 2

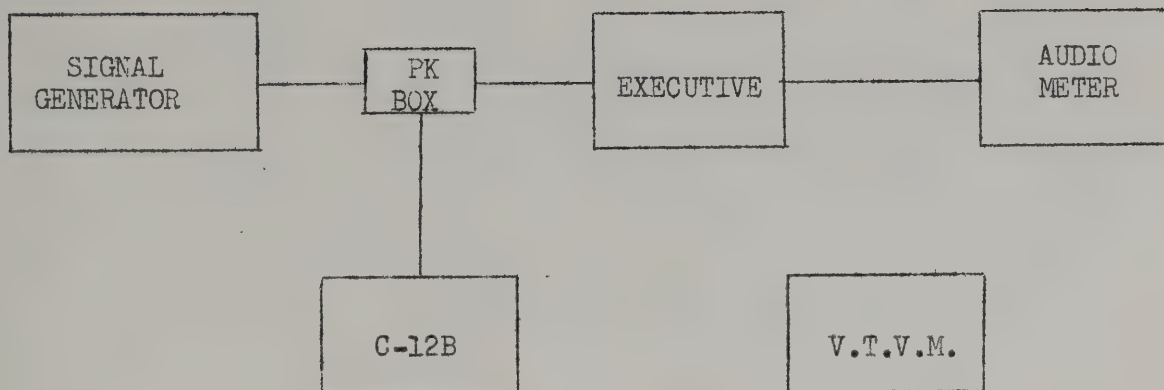
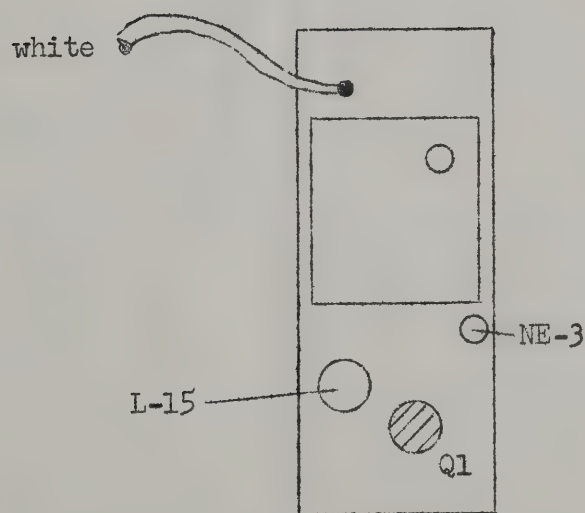


FIG. 3



FILTER

FIG. 4

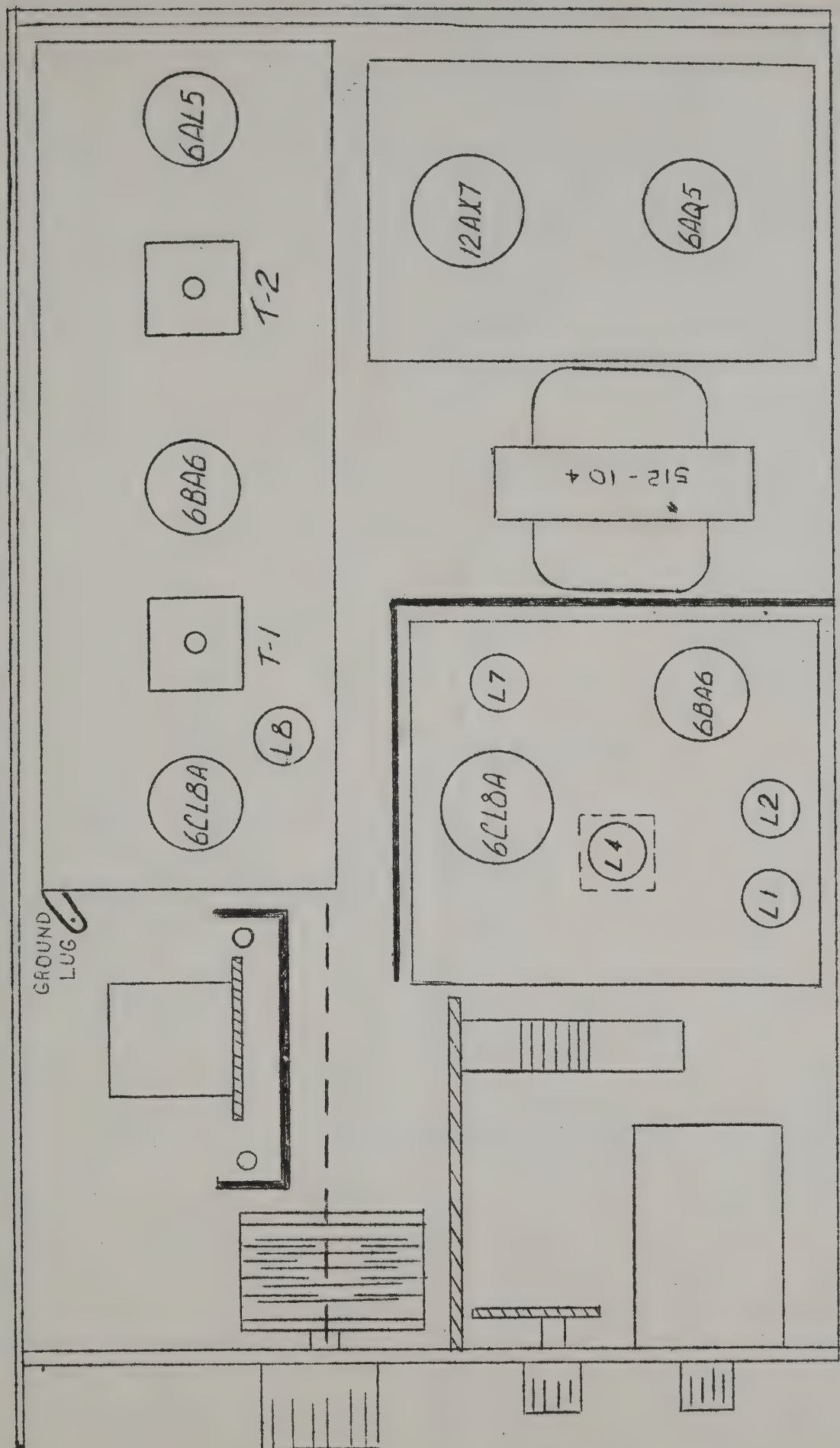
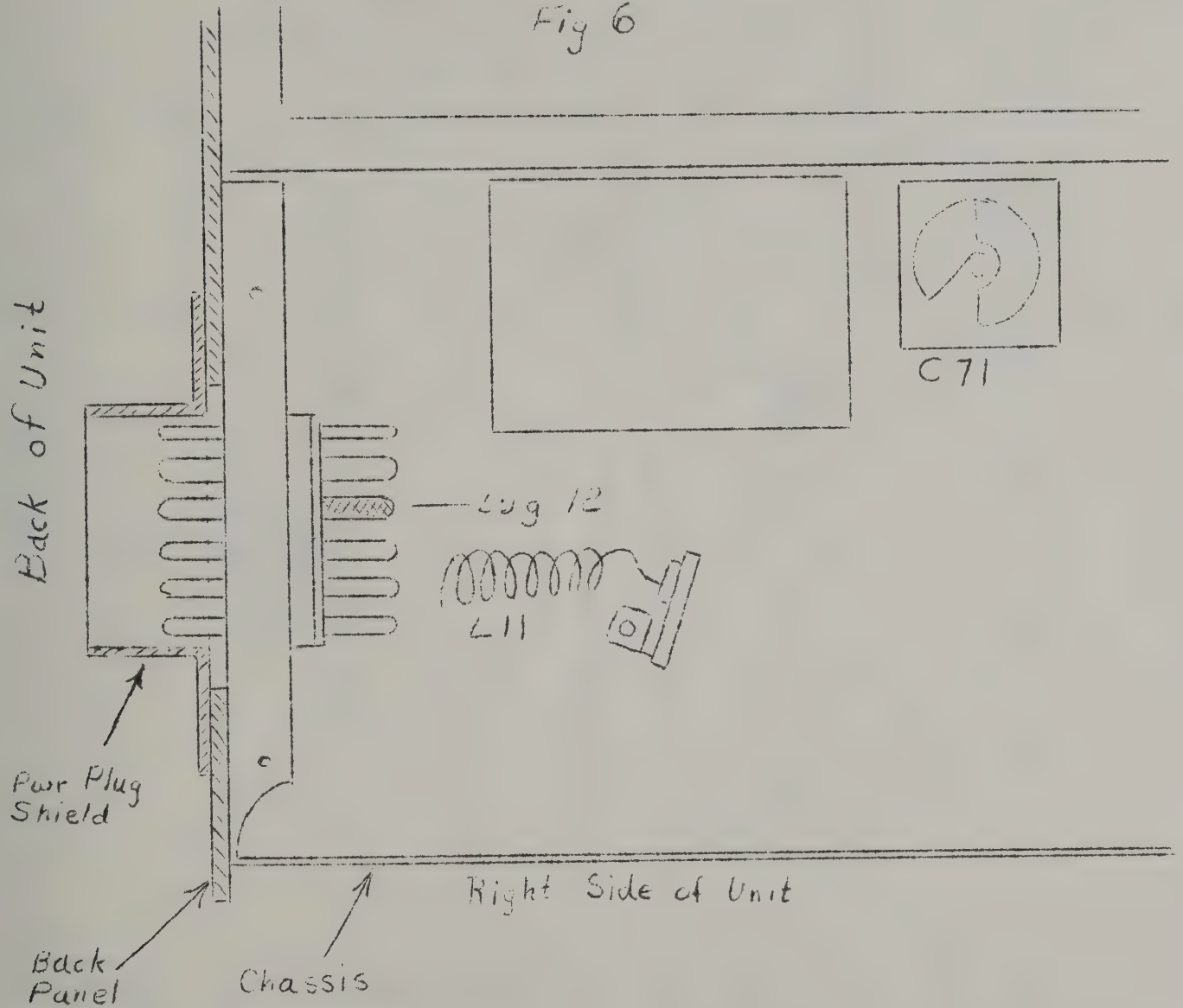


Fig. 5



Test Jumper

Fig 6



10-14-8

Fig 7

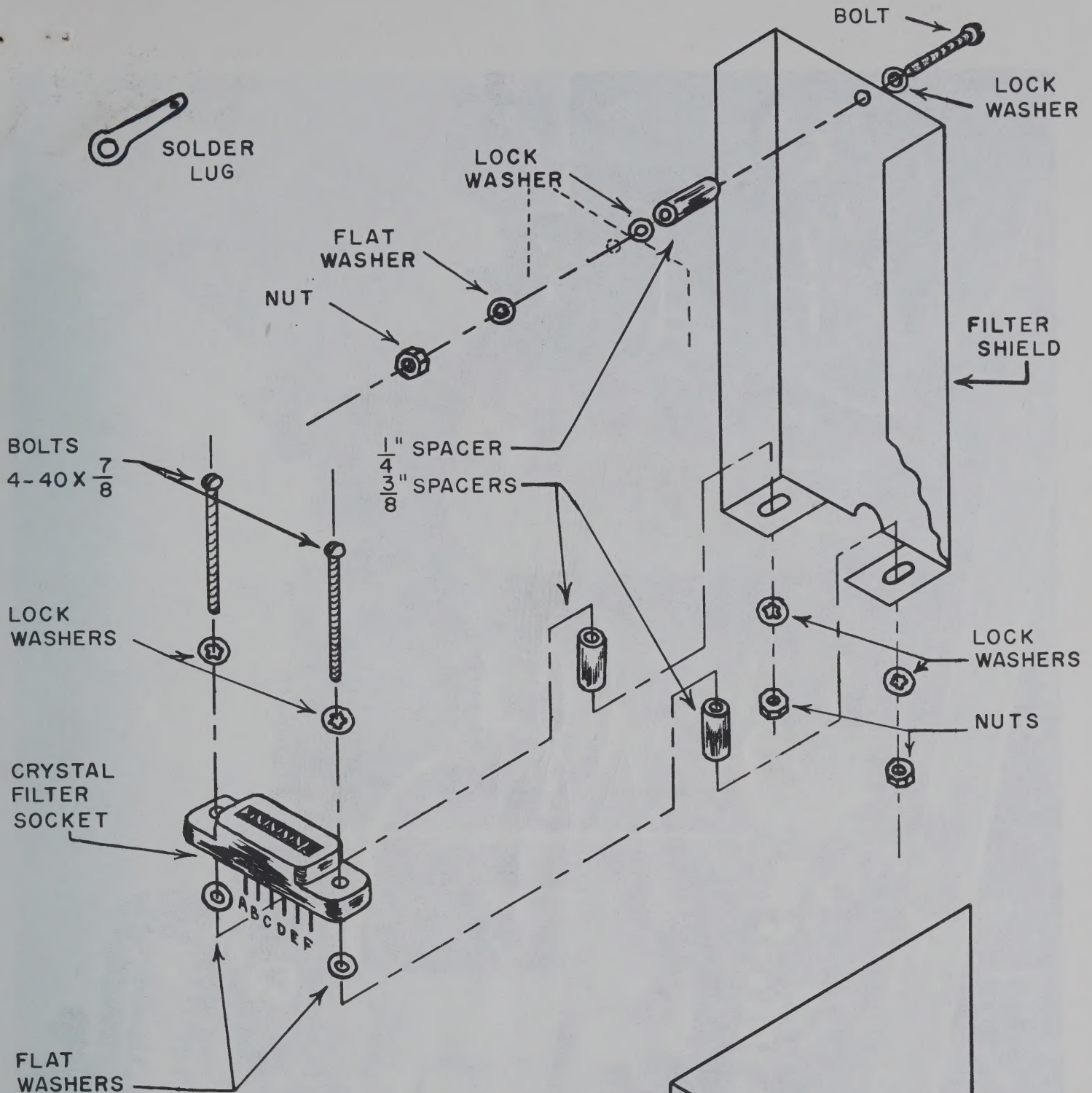
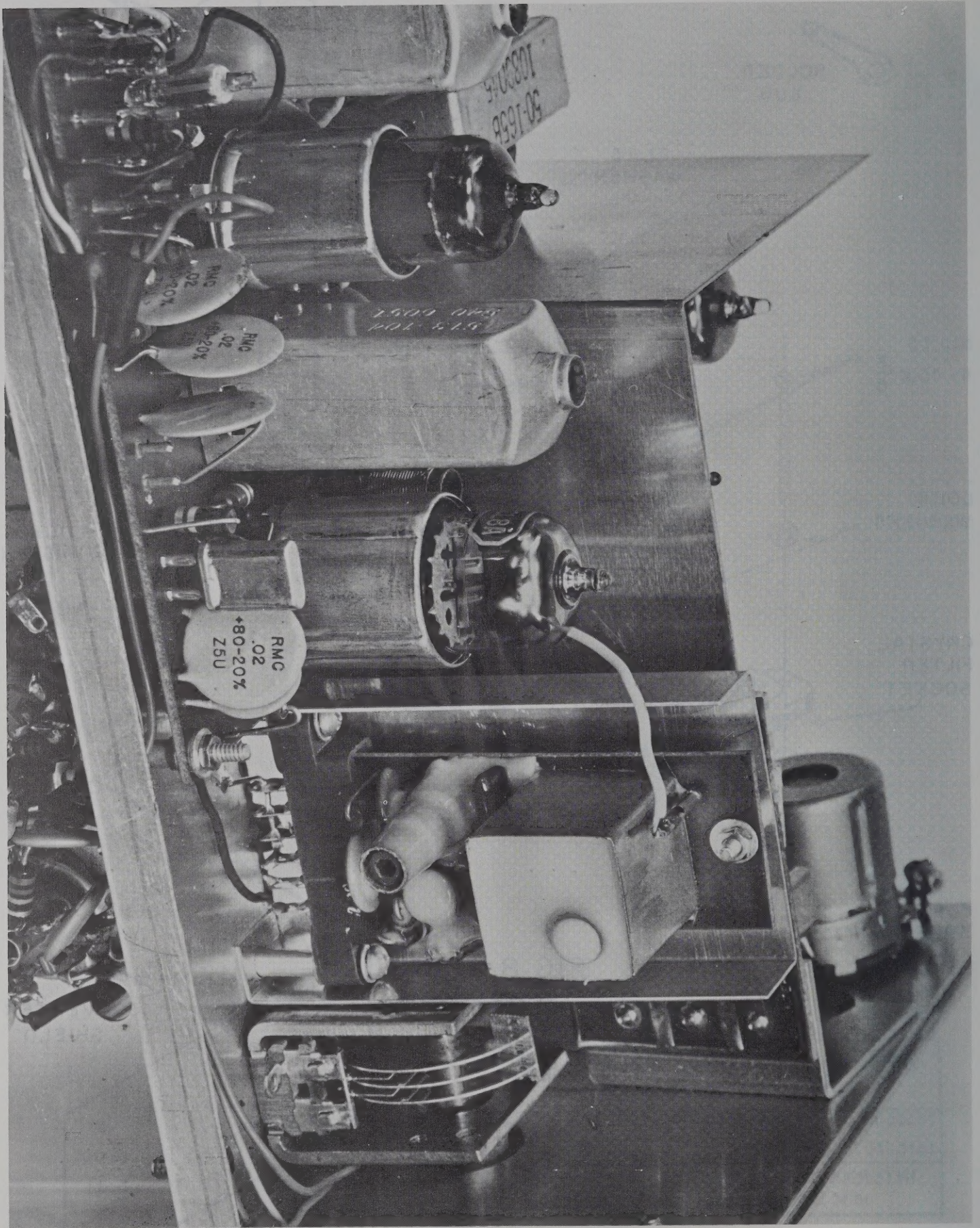
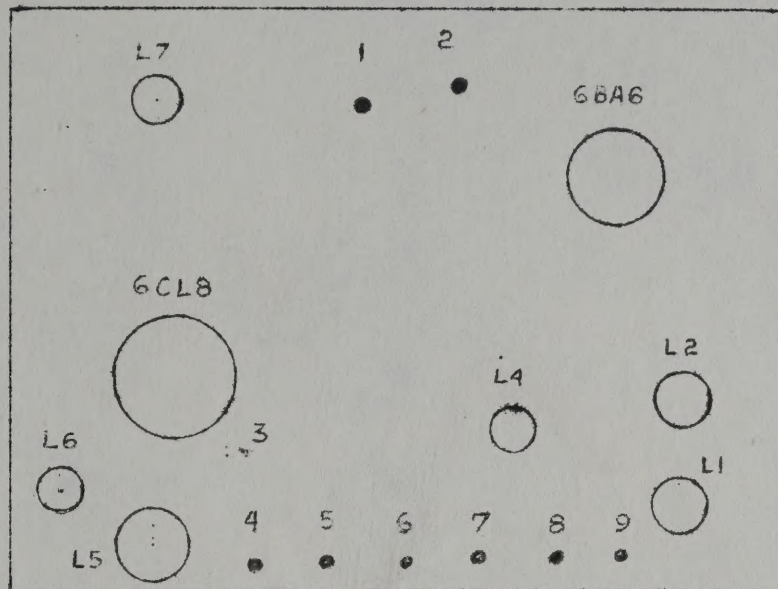


FIG. 8

CRYSTAL FILTER, SHIELD AND SOCKET ASSEMBLY		
DRAWN BY- <i>JB</i>	CHECKED BY-	APPROVED BY
DATE - 11/7/61	DATE -	<i>WMA</i>
INTERNATIONAL CRYSTAL MFG. CO., INC.		
18 N. LEE, OKLAHOMA CITY, OKLAHOMA		





1	WHITE	6	BLUE
2	Not Used	7	BLACK
3	PINK	8	GREEN
4	PINK	9	Not Used
5	YELLOW		

Figure 9

